

REMARKS

Applicants submit the following remarks in response to the Office Action mailed May 2, 2008.

In response to Examiner's requirement of restriction under 35 U.S.C. §§ 121 and 372, Applicants confirm their election, without traverse, to prosecute Group I, claims 1, 3-22, 130-143, and 159-167 on the merits.

Please cancel claims 23-129, 144-158, and 168-177, without prejudice, as being drawn to non-elected inventions. Applicants reserve the right to file divisional applications or take such other action as deemed necessary with regard to the non-elected groups.

Please cancel claims 130-143 and 159-167, without prejudice. These claims had been added to the present application in order to preserve rights under 35 U.S.C. § 135 (b) (2) to claim the same or substantially the same subject matter included in the claims of the Yeates et al U.S. Patent Application Publication No. US 2006/0047130 (hereinafter "the Yeates '130 publication"), which issued on March 2, 2006. Claims 130-143 and 159-167 also claim the same or substantially the same subject matter included in the claims of the Yeates et al PCT Publication No. 2006/028940 A1, published March 16, 2006. Claims 117-151 were identically copied from claims of the Yeates '130 publication, and claims 152-177 were substantially copied from claims of the Yeates '130 publication. The corresponding claims in the Yeates '130 publication have been cancelled.

Claim Rejections—35 U.S.C. § 112

Claims 130-143 and 165 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. For the purpose of timely prosecution of this application, such claims have been cancelled and the rejections of these claims are moot. Applicants take no position on the merits of the rejection.

Claims 130-141 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. For the purpose of timely prosecution of this application, such claims have been cancelled and the rejections of these claims are moot. Applicants take no position on the merits of the rejection.

Claim Rejections—35 U.S.C. § 102

Claims 130-134, 136-138, and 140 were rejected under 35 U.S.C. § 102 as being anticipated by Cheung (US2001/0046943). For the purpose of timely prosecution of this application such claims have been cancelled and the rejections of these claims are moot. Applicants take no position on the merits of the rejection.

Claim Rejections—35 U.S.C. § 102/103

Claims 1, 4-9, and 19-22 were rejected under 35 U.S.C. § 102 (b) as anticipated by or, in the alternative, under 35 U.S.C. § 103 (a) as obvious over Buffum '824. In summary, the Examiner finds that the catalyst of Buffum '824 is supported on a refractory solid support containing 0.1-10% zirconium silicate as the material before firing. (Office Action at p. 7) The Examiner asserts that although Buffum is silent in regard to the composition comprising zirconium silicate in the final product, the carriers J and R-W in Buffum are fired at temperatures in the range of 1393-1414 °C. The Examiner finds that these temperatures are "well below the decomposition of zircon to zirconia", citing the present application at p. 8. (Office Action at p. 8)

Applicants respectfully submit that the Examiner's rejection of the claims is in error. Buffum teaches in Table 5 that zirconium silicate may be used in preparation of the carrier. However, these same examples also teach the presence of calcium or barium nitrates when zirconium silicate is used. Blumenthal's "The Chemical Behavior of Zirconium" (Van Nostrand Co., 1958), p. 221 (copy of relevant pages attached), teaches that zircon reacts with

CaO starting at a temperature of 1118 degrees to form calcium zirconosilicate, and upon higher temperature heating forms free zirconia (ZrO_2). Calcium nitrate (melting/decomposition temperature 561°C ; CRC Handbook of Chemistry and Physics, 76th Ed, 1995, p. 4-48) and barium nitrate (melting/decomposition temperature 590°C ; CRC Handbook of Chemistry and Physics, 76th Ed, 1995, p. 4-43) would be converted to the oxide species at the calcination temperatures given in Buffum (1350 to 1500 degrees). Based on Blumenthal's teaching, the zirconium silicate examples in Table 5 would reasonably be expected to form zirconia (ZrO_2) from the reaction of calcium or barium nitrate and zircon even though calcined at a temperature lower than that at which pure zirconium silicate would be expected to decompose to form zirconium dioxide. Thus, the presence of the calcium or barium compounds results in decomposition of zirconium silicate to zirconium dioxide at a lower temperature. This is consistent with the teaching in Buffum at column 3, lines 10-18, which discuss the generation of zirconia in situ from compounds containing zirconium.

Applicants also submit that Buffum does not teach the use of a promoter which is a member of a redox half reaction pair. The catalyst of Buffum is not a catalyst to which gaseous NO (for example) is fed during an epoxidation reaction. Rather, the lithium nitrate is a source of lithium as a promoter.

Applicants request reconsideration of Claims 1, 4-9, and 19-22.

Claims 10, 14, and 18 were rejected under 35 U.S.C. § 102 (b) as anticipated by Buffum '824, or, in the alternative, under 35 U.S.C. § 103 (a) as obvious over Buffum '824 in view of Weber '134.

Applicants respectfully request reconsideration of these claims. For the reasons provided above, a carrier containing a zirconium compound present substantially in the form of zirconium silicate is not anticipated or suggested by Buffum. Weber teaches the preparation of high purity alpha alumina bodies which can be used as catalyst supports.

Weber is completely silent on the use of any zirconium compounds in the carrier, let alone a carrier containing a zirconium compound present substantially in the form of zirconium silicate. There is no reason for one of skill in the art to combine the teachings of these references. And even if one of skill in the art combined the teachings, the combined teachings do not lead one to the claimed invention.

In particular, Weber fails to acknowledge that higher purity carriers have their own problems. For example, silver particles deposited on alpha-alumina (as opposed to those deposited on SiO_2) are not stable. Modification of the alpha-alumina support has been recommended to decrease silver particle mobility. S.N. Goncharova, et al., "Size effects in ethylene oxidation on silver catalysts. Influence of support and Cs promoter", (Applied Catalysis, 1995) (copy attached). Particle movement, combined with heating during catalyst use, causes particles to coalesce and to sinter. Thus, higher purity alpha-alumina carriers have fewer barriers to silver sintering because silver particles are not stable on alpha-alumina. Silver sintering can lead to activity decline and catalysts aging more quickly. Weber does not suggest or disclose the necessity of compounds in the carrier to act as a barrier to silver sintering, let alone the use of a zirconium compound to enhance one or more of catalyst activity, efficiency, and aging.

With regard to claim 18, the Examiner correctly notes that Buffum is silent in regard to the morphology of the solid support. The Examiner finds that the solid support of Buffum has a substantially similar composition to that of the instant application (citing the § 102/103 rejection of claim 1); in particular the Buffum support contains a large percentage of alpha alumina, and has a substantially similar pore volume and surface area (citing 102/103 rejection of claim 19 above). Thus, the Examiner concludes that the other properties of the solid support of Buffum, including the morphology, would also be substantially similar to the morphology of claimed in claim 18. (Office Action at 10)

As the Examiner acknowledges, Buffum is silent in regard to the morphology of the solid support. However, Buffum does teach how the preferred carriers are made: mixing a powdered alpha-alumina, calcium silicate and zirconia with water and a binder and/or burnout material to prepare a mixture which is then extruded and calcined at a temperature ranging from about 1350°C to about 1500°C. (Buffum, col. 3, lines 35-40, Illustrative Embodiments Carrier Preparation, Carrier A, Col. 7-8.) Thus, the carrier in Buffum is prepared from a *starting material comprising alpha-alumina*.

In contrast, as taught in the present application, at pp. 7 and 8, *starting materials such as boehmite alumina and/or gamma-alumina* are peptized with a mixture containing an acidic component and halide anions. The peptized halogenated alumina is then formed, such as by extruding or pressing, dried, and calcined to form pills of a modified alpha-alumina carrier. It is this modified alpha-alumina carrier which comprises the lamellate or platelet morphology. See also US Pat. No. 4,994,589, col. 12-13.

In order to sustain an inherency rejection, the Examiner must demonstrate that the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes. Given that the starting materials for the carrier in Buffum and the process for making the carrier in Buffum are both different from the starting materials and the processes used to produce carriers with platelet morphology, the Examiner has not met his burden of showing that the morphologies of the carriers will necessarily be the same.

The rejection of claims 10, 14, and 18 should be withdrawn.

Claims 142-143, and 166 were rejected under 35 U.S.C. § 102 (b) as anticipated by Buffum '824, or, in the alternative, under 35 U.S.C. § 103 (a) as obvious over Buffum '824 in view of Thorsteinson '140. For the purpose of timely prosecution of this application, such

claims have been cancelled and the rejections of these claims are moot. Applicants take no position on the merits of the rejection.

Claim Rejections—35 U.S.C. § 103

Claims 11-13 and 15-17 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Buffum '824 in view of Weber '134. As explained above, Buffum teaches that if zirconium silicate is used, it is in the presence of calcium or barium which react to *decompose* the zirconium silicate to zirconium dioxide. Claim 1 specifies that the zirconium compound present in the carrier is substantially in the form of zirconium silicate. Thus, these claims are not anticipated by Buffum. Moreover, there is nothing in Buffum to suggest that calcium or barium should not be used or that their presence was detrimental. Thus, one of skill in the art would have no reason to combine Buffum with the teaching of Weber that "high purity" supports are preferable.

Applicants request that the rejections of claims 11-13 and 15-17 be withdrawn.

Claim 18 was rejected under 35 U.S.C. § 103 (a) as being unpatentable over Buffum '824 (alternatively in view of Weber as applied to claim 14 above) further in view of Thorsteinson '140.

For the reasons described above, Buffum does not teach or suggest the use of a zirconium component present in the support as zirconium silicate. For the reasons provided above, Buffum and Weber cannot be combined to arrive at all of the elements of claim 18. Thorsteinson is directed to the use of a high silver content in catalysts. Some of the carriers used to produce the high silver catalysts are described as having a lamellate or platelet-type morphology. However, Thorsteinson makes no mention of carriers/supports with a zirconium compound present substantially as zirconium silicate to increase at least one of efficiency, activity and aging and does not suggest the need for the same. Combining Thorsteinson with Buffum would not lead to a carrier with an interlocking platelet

morphology where the carrier contains zirconium component present in the support substantially as zirconium silicate.

Claims 130-141 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Matusz '075 in view of Thorsteinson '140. For the purpose of timely prosecution of this application such claims have been cancelled and the rejections of these claims are moot. Applicants take no position on the merits of the rejection.

Claims 142-143 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Thorsteinson '140. For the purpose of timely prosecution of this application such claims have been cancelled and the rejections of these claims are moot. Applicants take no position on the merits of the rejection.

Claims 159-167 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Buffum '924 view of Thorsteinson '140, Weber '134, and Jin '195. For the purpose of timely prosecution of this application such claims have been cancelled and the rejections of these claims are moot. Applicants take no position on the merits of the rejection.

Applicants respectfully submit that claims 1, and 4-22 are in condition for allowance.

Respectfully submitted,

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